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LOWERING OF THE GROUND-WATER TABLE.

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SINCE the dry season of 1901 the people of the eastern half of Kansas have been more or less concerned about the water supply; and the dry weather of 1910 and the drouth of last summer have increased the growing anxiety about water for domestic purposes. For the past three years the streams of eastern Kansas have been low, at times very low, and for the greater part of that time many have been dry; in fact, in some localities creeks and wells which went dry in 1901 have never recovered their former stability. This statement holds good in spite of the fact that the major streams of this part of the state have passed through two of the greatest flood areas known in their history.

Surface wells and water courses dependent on surface water are likely to go dry during any period of decreased rainfall. Such cases are of more or less local extent in their happening. However, when the eastern half or two-thirds of the state begins to experience such a condition, it becomes more than a local question, the seriousness of which, like the cause of the condition, seems to be little understood by the people in general. Creeks and rivers that were seldom dry or very low in former years are now dry a large part of the time. Wells that were inexhaustible now have only a meager supply of water, and many have had to be dug deeper. Thus, many people ask: "Why do the creeks go dry in two or three weeks after a rain has filled them bank full?" The answer is easy, but hard to get the average person to understand and believe. The ground-water has been perceptibly lowered, and the ground-water table has sunk below the beds of the streams. Hence, instead of the ground-water flowing through the ground and feeding the streams, causing a continuous flow, the water from the streams in a very short time soaks into the banks and bottoms of the streams and settles to the level of the ground-water table, leaving the streams dry except in the deepest pools.

In the western part of the state the wells and springs and creeks fed by springs which are connected with the underflow have not varied perceptibly in the period of time that the writer has known western Kansas, which is nearly thirty years. Thus it is well established that the underflow is not dependent on the rainfall in that section of the state. Another proof of that fact, if another were needed, is that creeks and ponds dependent on surface water, or that coming from local rainfall, are dry most of the time. The underflow varies but slightly in wet and dry years, and often the variation is contrary to would be expected.

In eastern Kansas the ground-water table is a different proposition. The water that falls on the surface and does not run off in the streams or is not used up immediately by vegetation percolates through the ground and settles down to a certain level known as the ground-water table, or the top of the permanent water supply. In general, this table is marked by the top of the water in the streams in any part of the state. The location of the table in any particular locality depends on the condition of the aquifer. Also, the underlying and overlying rocks being pervious or impervious influence the amount of water received by the aquifer as well as the retention of the same.

To say that the ground-water table has been lowered four feet, or six feet, or eight feet, does not refer to any particular locality, but means that the area comprising the eastern half of Kansas taken as a whole has had the ground-water depleted until it has sunk somewhere in that range. In the vicinity of Baldwin some creeks are dry that had pools as deep as eight feet, while in others the water maintains its level at about five feet below the former level. On the other hand, the writer knows of one well of living water that lowered nearly twelve feet, and several others that were lowered from five to eight feet. Nor is this locality very different from those all over this part of the state. From reports gathered from this entire end of the state the writer estimates that since 1901 the water table has been lowered an average of five or six feet. And what makes the condition all the more serious, in many places several feet of dry earth intervene between the water table and the surface water from the late fall rains. The amount of rainfall necessary to thoroughly soak the ground all the way down to the ground-water table is very problematical. However, this is one of the conditions to be met before the raising of the table begins.

Granting that the above facts are approximately correct and disregarding the last-named condition, it is interesting to note some of the estimates necessary to restore the ground-water table to its former level. It will take all the rainfall for two average years to restore it; or, it will take twenty per cent above average for ten years or ten per cent above average for twenty years. A gain of two inches per year for thirty-five years would make up the loss. As the surface water is seldom sufficient in any part of Kansas to last through the dry parts of the year, it is evident that stockmen and municipalities should seek a water supply well below the present water table to be sure of a permanent water supply. Although the records since 1836 show a gradual increase in the rainfall in eastern Kansas, at the same rate it would not restore the shrinkage in the next fifty years. Then the question naturally arises, will the former ground-water table ever be restored? Is there a probability that there will be an excessive rainfall in the next ten or twenty or even fifty years, sufficient to restore the former level? Can a system of ponds and small lakes be built by damming the draws and creeks sufficient to restore the old table or to aid in maintaining the present level? Will the creeks continue to build up their flood plains? And if so, will they become permanent surface-water streams? Such questions can not be discussed in this paper, but they suggest that the lowering of the ground-water table is one, not only of much scientific interest, but also one of great economic importance to farmers, stockmen, and city authorities who have to provide a permanent water supply for domestic purposes.